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ABSTRACT

Factor structures and first semester grade point average validities for several college ability test scores are compared for regularly admitted freshmen and for freshmen admitted to the Special Educational Opportunities Program (SEOP) at the University of Illinois in September, 1968. Most students in the special program were Negro, averaged much below the mean test score levels of regularly admitted freshmen, and carried courseloads half comprised of special courses developed by several departments. Two factors, verbal and quantitative, described the test score relationships for both the SEOP and regularly admitted freshmen. Multiple correlations predicting first term grade point average from high school percentile rank, SCAT Verbal and SCAT Quantitative scores were .4 for regularly admitted freshmen and .3 for SEOP freshmen. Multiple correlations for SFOP freshmen rose to .4 when the number of special credits was added to the prediction equation. (Author)

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Factor Structures and Predictive Validities of College Ability Tests for Regularly Admitted and Disadvantaged Beginning Freshmen at the University of Illinois

Recent studies have reported similar predictive validities for commonly used ability tests for groups of Negro and white college freshmen (Munday, 1965; Biaggio, 1966; Cleary, 1968; Davis, Loeb and Robinson, 1969). Comparative studies within integrated colleges are probably based upon Negro and white freshmen groups who, though showing large mean ability test differences, meet common local admission standards. The admissions scene is changing. Many universities are now recruiting Negro and other minority group freshmen into special college programs. Thus, the population of disadvantaged freshmen applicants is expanding; mean test score differences between regularly admitted and disadvantaged groups are apt to grow larger, and the introduction of compensatory or remedial coursework will possibly change customary criteria of academic success. More documentation and evaluation of these special programs are needed across many types of colleges in order to develop policy decisions for admission, counseling and curricula development associated with new programs for the disadvantaged.

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Subjects and variables

In September 1968, the University of Illinois at Urbana admitted 515 beginning freshmen, most of whom were Negro, to its Special Educational Opportunities Program (S.E.O.P.). Students in this new program met minimum

but not de facto admission requirements. The major aim of the S.E.O.P. recruitment was to provide the opportunity for college admission to disadvantaged students who otherwise would not attain it. Increased financial aid and tutorial services were budgeted, and several departments, principally rhetoric, mathematics and psychology, developed special courses for S.E.O.P. freshmen. Routine admission and guidance test data were obtained for most S.E.O.P. freshmen; this information included high school percentile rank (HSPR) and scores on the American College Test (ACT), the School and College Ability Tests Form 1A (SCAT), and the Cooperative Reading Comprehension Tests Form UA (COOP Reading). First semester grade point averages were obtained for both regularly admitted and S.E.O.P. freshmen; averages for S.E.O.P. were based upon grades earned in regular courses as well as grades earned in special courses, which typically comprised about half of the course load carried by S.E.O.P. freshmen.

Intercorrelations among the preadmission measures

High school percentile ranks and scores on the ACT, SCAT and COOP Reading were all available for 111 men and 152 women admitted to the S.E.O.P. and for 2939 men and 1917 women who were regularly admitted beginning freshmen in September 1968. Means, standard deviations, and intercorrelations among these measures are shown in Table 1 for the four freshman groups. For each sex, asterisks in Table 1 indicate significant differences -- tested at $\alpha = .05$ via Fisher's transformation -- between the correlations for the S.E.O.P. and regularly admitted freshman groups between each pair of measures.

Table 1 about here

For males, seven of the eight correlations of HSPR with test scores were significantly higher within the group of regularly admitted freshmen. None of the remaining 29 correlations were significantly different for the S.E.O.P. and regularly admitted male freshmen.

Four of the eight correlations of HSPR with test scores and the correlation between the two mathematics test scores were significantly higher for regularly admitted than for S.E.O.P. females. Also, the correlation between the two ACT reading tests, the correlation between the COOP Reading Comprehension and ACT Social Studies Reading, and the correlation between COOP Reading Comprehension and SCAT Quantitative were significantly higher for S.E.O.P. than for regularly admitted freshmen.

Thus the regularly admitted and the S.E.O.P. groups showed similar test score relationships but different HSPR-test score relationships. The behaviors measured by high school grades or percentile ranks is also ~~in-~~ ~~consistent~~ in other studies of Negro freshmen (McKelpin, 1965; Munday, 1965; Harris and and Reitzel, 1967; Cleary, 1968).

Factor Structures

The intercorrelation matrices for the S.E.O.P. freshmen were factored by the principal axes method with multiple R-squared communality estimates. Two, possibly three, factors accounted for the intercorrelations (Horn, 1965; Humphreys and Ilgen, 1969). For comparison, three factors were extracted by the principal axes method (unities entered in the diagonals) from the

intercorrelation matrices for the regularly admitted freshmen. Orthogonal varimax rotation yielded the factor structure matrices shown in Table 2.

Table 2 about here

Factor structures were similar for all groups. Two interpretable factors, marked clearly by SCAT Verbal and SCAT Quantitative, respectively, were evident in each group, although less sharply defined for S.E.O.P. freshmen. Three factors reflect an overdetermined solution for the regularly admitted freshmen; the third factor for S.E.O.P. freshmen, defined by tests of reading comprehension, collapsed with the first verbal factor for regularly admitted freshmen. HSPR was associated with the second quantitative factor for regularly admitted freshmen, while for S.E.O.P. male freshmen, HSPR showed only a puzzling negative loading with the third factor.

Grade point average validities

The correlations of first semester GPA with HSPR, SCAT Verbal and SCAT Quantitative, and the multiple correlations of first semester GPA with combinations of these preadmission ability measures are shown in Table 3. S.E.O.P. group sizes are larger than those reported in Tables 1 and 2 since many S.E.O.P. freshmen lacked only ACT scores.

Table 3 about here

The number of special coursework credits taken during the first semester was also included as a predictor for S.E.O.P. freshmen. Multiple correlations

of GPA with the HSPR, SCAT Verbal and SCAT Quantitative combination were approximately .4 for regularly admitted and .3 for S.E.O.P. freshmen. Differences in the validities of HSPR for regularly admitted and S.E.O.P. freshmen do not explain this difference in the multiple correlation level, since the multiple correlation of GPA with two SCAT score combinations dropped to .3 for regularly admitted and .2 for S.E.O.P. freshmen. Instead the differences in the multiple correlation level disappear when the number of special coursework credits is included as a predictor for the S.E.O.P. groups. The regression coefficient for the special credits predictor was positive and significantly different from zero ($F_{1,163}$ = 11.6 for S.E.O.P. males, $F_{1,232}$ = 17.7 for S.E.O.P. females). This confirms the effectiveness of the special courses for increasing the likelihood of early survival.

Conclusions

Factor structures for the ACT, SCAT and COOP Reading measures were similar for both sexes for the two freshman groups at Urbana -- beginning freshmen who met moderately restrictive admissions standards and S.E.O.P. freshmen who in the main not only did not qualify for admission under competitive admissions requirements but also must have demonstrated a high financial need. Despite consistent mean test differences between the groups of the order of one and one-half to two standard deviations, these tests measured clear verbal and quantitative factors for both groups. A weak third factor of reading comprehension was found for S.E.O.P. but not regularly admitted freshmen.

High school percentile rank possibly measures different behaviors in the two freshmen groups. It related with test scores for regularly admitted freshmen, but was relatively independent of test scores for S.E.O.P. freshmen, especially males.

Multiple correlations of first semester GPA with HSPR and the two SCAT scores were higher for regularly admitted freshmen. However, when the number of special courses taken during the first semester was included as a predictor, multiple correlations for both groups were at the same .4 level.

The use of these academic ability tests for selection to these types of programs appears justified both on the basis of test communality and predictive validity.

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Table 1

Means and Standard Deviations of Preadmission Measures for S.E.O.P. and Regularly Admitted Freshmen

	Men				Women			
	S.E.O.P. (N = 111)		Regular (2939)		S.E.O.P. (N = 152)		Regular (N = 1917)	
	M	SD	M	SD	M	SD	M	SD
ACT English	15.4	4.8	23.2	3.2	15.6	4.7	24.9	2.8
ACT Mathematics	16.1	5.7	29.1	4.0	12.0	6.0	26.7	4.6
ACT Social Studies	17.3	6.0	26.2	3.9	14.2	5.7	25.9	3.8
ACT Natural Science	17.0	6.0	28.0	3.9	13.8	5.2	25.6	4.2
COOP Vocabulary	24.2	7.4	38.6	7.7	22.9	8.3	40.4	7.5
COOP Reading	19.0	6.9	32.8	7.5	16.0	5.8	32.5	7.7
SCAT Verbal	17.9	6.8	31.7	8.9	17.2	6.9	33.8	8.7
SCAT Quantitative	16.7	6.4	35.2	7.7	12.1	5.1	29.1	8.4
HSPR	62	25	85	12	72	19	88	10

Table 1 (continued)

Intercorrelations Among the Preadmission Measures for S.E.O.P. and *Regularly* Admitted Freshmen

Measures	Intercorrelations[a]																	
	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)	
(1) ACT English			41	*42*	41	*51*	46	*45*	59	*55*	44	*56*	54	*58*	34	*40*	04	*30*
(2) ACT Mathematics	34	*34*			34	*32*	46	*47*	40	*31*	34	*37*	37	*34*	75	*76*	04	*40**
(3) ACT Social Studies	48	*53*	36	*30*			52	*51*	54	*57*	49	*58*	53	*64*	23	*33*	-13	*24**
(4) ACT Natural Science	47	*44*	36	*46*	65	*52**			48	*45*	39	*50*	45	*50*	33	*45*	-22	*27**
(5) COOP Vocabulary	61	*58*	33	*28*	61	*59*	50	*49*			64	*60*	77	*82*	35	*35*	-11	*25**
(6) COOP Reading	62	*52*	36	*33*	71	*56**	59	*52*	64	*61*			63	*66*	32	*43*	06	*25**
(7) SCAT Verbal	57	*62*	28	*33*	59	*63*	51	*53*	78	*83*	68	*65*			34	*39*	-10	*26**
(8) SCAT Quantitative	40	*33*	61	*77**	40	*29*	39	*44*	38	*28*	50	*36**	35	*32*			15	*44**
(9) HSPR	25	*28*	20	*37**	13	*27*	19	*30*	12	*28**	14	*24*	05	*27**	17	*42**		

[a] Correlations among the measures for S.E.O.P. males (N = 111) are presented first and regularly admitted males (N = 2939) are presented second in the upper diagonal; correlations among the measures for S.E.O.P. females (N = 152) are presented first and regularly admitted females (N = 1917) are presented second in the lower diagonal. Decimals are omitted. Asterisks indicate significant differences at $\alpha = .05$.

Table 2

Three-Factor Structure Matrix After Orthogonal Varimax Rotation for S.L.O.P. Freshmen

Measure	Men (N = 111)				Women (N = 152)			
	V_1	V_2	V_3	h^2	V_1	V_2	V_3	h^2
ACT English	.59	.31	.05	.44	.59	.35	.21	.52
ACT Mathematics	.27	.80	.02	.71	.18	.66	.14	.49
ACT Social Studies	.58	.21	.31	.48	.50	.27	.59	.67
ACT Natural Science	.45	.39	.41	.52	.40	.32	.52	.54
COOP Vocabulary	.83	.21	.13	.75	.79	.22	.23	.72
COOP Reading	.72	.19	-.04	.55	.62	.32	.48	.72
SCAT Verbal	.81	.19	.11	.70	.80	.14	.27	.73
SCAT Quantitative	.24	.77	-.16	.67	.26	.67	.17	.54
HSPR	-.04	.09	-.47	.23	.05	.29	.07	.09
Percentage of Variance	32	18	6	56	28	16	12	56

Table 2 (continued)

Three-Factor Structure Matrix After Orthogonal Varimax Rotation

for Regularly Admitted Freshmen

Measure	Men (N = 2939)				Women (N = 1917)			
	V_1	V_2	V_3	h^2	V_1	V_2	V_3	h^2
ACT English	.60	.35	.10	.48	.64	.27	.02	.49
ACT Mathematics	.20	.80	.07	.69	.19	.80	.04	.68
ACT Social Studies	.68	.22	.20	.55	.68	.22	.16	.54
ACT Natural Science	.49	.41	.23	.46	.53	.42	.19	.49
COOP Vocabulary	.83	.20	-.13	.74	.84	.16	-.12	.75
COOP Reading	.69	.30	.16	.59	.68	.27	.13	.55
SCAT Verbal	.87	.22	-.06	.81	.88	.20	-.07	.81
SCAT Quantitative	.24	.80	.04	.70	.18	.82	.03	.71
HSPR	.19	.46	.00	.25	.23	.43	-.01	.24
Percentage of Variance	34	22	2	58	36	21	1	58

Table 3

First Semester GPA Validities of HSPR, SCAT V, SCAT Q

and Special Coursework Units

Predictors	Men		Women	
	S.E.O.P. (N = 168)	Regular (N = 2939)	S.E.O.P. (N = 237)	Regular (N = 1917)
Single:				
HSPR:	.14	.35	.25	.34
SCAT V	.23	.25	.17	.28
SCAT Q	.14	.31	.11	.21
Special Units	.17	---	.19	---
Multiple:				
SCAT V, SCAT Q	.23	.34	.18	.30
HSPR, SCAT V, SCAT Q	.30	.41	.29	.39
HSPR, SCAT V, SCAT Q, Special Units	.39	---	.39	---